Remarks for Knowledge Sharing Institute: Glenda Lappan
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1. *What do we know about teacher learning and curriculum materials that should guide our design of materials that are "educative" of teachers?*

    - Teachers, through their experience in the classroom, learn the skills and facts of the subject that they teach. There is often little in curriculum materials or the assessments for which teachers are held accountable that push toward conceptual rather than instrumental learning. In our experience, it is extremely difficult for teachers to conceive of, plan for , and carry out teaching that has the goal of making sense of ideas, connecting them to what you already know and trying them on to see where they might lead you, etc. without the support of good curriculum.

    - Curriculum materials can provoke dissatisfaction with such limited learning opportunities for students. They can raise the possibility of engaging students with subject matter content in more challenging ways. However, unless materials and professional development activities around the materials also provoke and provide opportunities to consider instructional strategies and pedagogical reasoning that support the goal of more deeply understanding the concepts and related skill and procedures embedded in the materials, the curriculum does not reach its potential.

    - Teachers do not have the time and resources to create a complete, connected, and challenging curriculum. However they are curriculum developers as they work to enact curriculum with their students. The following are some of the considerations that are needed to use, adapt, create curriculum tasks for particular students at a particular place in their development with particular instructional and learning goals.

    - As teacher enact curriculum they may or may not actually teach what the curriculum developers intend.

      What ways of thinking do teacher need in order to be the teaching partner in curriculum development?

      Setting Goals/Analyzing Tasks
      - How does this task push my mathematical agenda?

      - What skill development, algorithm development, higher order thinking development will the task support?

      Taking Stock
      - What tools and resources do students need to tackle the task?
        Intellectual/Knowledge

Physical
Human

- What skills, processes, ways of thinking would contribute to students' success with the task?

Reaching ALL Students

- What changes in the context would make it more engaging for my students?

- How will I reach <u>all</u> students with this task?
  - What are my core goals?
  - What are my extension questions?
  - What scaffolding questions will help students who are struggling, but that will not reduce the cognitive demand of the task?

Pulling out the Mathematics

- What summary questions can I ask to help students make the mathematics used and invented more explicit?

- What reflection questions can I ask to help students make connections between the mathematics of the task and the growing mathematical skills, understandings, and ways of thinking of the student?

Assessing and Evaluating

Students:

- How will I know what sense my students have made of the task?

  - Making instructional decisions
  - Reporting students progress
  - Evaluating the classroom environment
  - Celebrating student accomplishment
  - Holding students accountable, setting expectations

Curriculum:

- How coherent, connected, and powerful is the sequence of tasks I have used to promote understanding of the core ideas that are my goals?

  - Do I have the "right stuff" for my students to chew on?
  - Is the sequence of tasks powerful?

2. *What do we know about teacher learning and curriculum materials that should guide our design of professional development to support 1) using high quality materials and 2) adapting more typical materials?*

- Professional development that is focused directly on the work of teachers around a particular curriculum can be very successful in enhancing teachers' knowledge of content for teaching. In order for this to be the result, Pd has to have the goal of creating a professional community in which the participants work together with the goal of enhancing student learning. We have come to believe that developing a language for talking about classroom instruction and analyzing teaching can be very helpful.

- We have also learned that teacher need to directly confront what their students know and do not know. This means that students work whether it be test performance or regular class activity can be a powerful tool for causing the dissonance needed to capture teachers attention and curiosity.

    - Using the classroom as a laboratory for exploration of teaching and learning. PD interacting with ones regular teaching responsibilities.

    - Treating teachers as equal partners in improving teaching and learning.

    - Japanese Lesson Study

    - Video cases and written cases

    - Teaching going public with their knowledge and dilemmas

- Curriculum materials teachers guides can also be PD. They follow a teacher into his or her classroom. What we can do that is particularly valuable and provocative is to provide appropriate questions in the TGs:

    - questions for engaging students in the work the teacher has set for them for the lesson,

    - questions to ask to probe students understanding,

    - questions to scaffold for students that are struggling,

    - questions to assess what sense students are making of the mathematics,

- questions that push the content further,
- questions that push toward connecting what is being learned to what one already knows,
- questions that extend the ideas of the tasks,
- questions that provoke explanation, conjecturing, reasoning, argument, the need for evidence, and curiosity
- What if…..
- Example—What are the variables in the situation? How are the quantitative variables related? Which variable should be thought of as depending on the other? What other forms of representation would shed light on the situation? What do graphs make easy to think about? What does an equation do for understanding the situation? How are these forms of representation connected?
- The more we can focus on the portrayal of possibilities in the classroom —questioning, analyzing student responses, listening, etc, the more in tune a teacher can be with student learning and with the potential of the curriculum.
- Stages of development in a teachers interaction with new curriculum:
    - Survival— focus on the technical aspects of teaching the curriculum
    - Curiosity, but still supplementing—what can I do with students to enhance their learning now that I have become comfortable with the curriculum? I am asking better questions and my students are performing beyond what I got with earlier curriculum.
    - Comfortable with the curriculum, less supplementing no new surprises.
    - Complacent Hits a plateau
    - What next?

3. *What do we need to know that we don't know?*

- More about effective sequences of investigation that lead to robust knowledge in an area of curriculum.
- What is conceptually difficult for students, why, and what tasks can help?
- What are effective delivery mechanisms for Teachers' Guides.
    - Video images?
    - CD Rom?
    - Print?
- What kinds of PD support build a community with professional interactions around curriculum over time?
- How effective are video and written cases at stimulating teachers who are experienced with the curriculum to engage in deeper content and pedagogical analyses that promote their continued growth?
- Does Japanese lesson study have a viable American version? How do we grow the critique leaders for such lesson study?
- What school mechanisms are needed to support life-long professional growth of teachers?
- What are effective ways of building support within the community for standards based curriculum implementation and teacher support?
- Retention—recruitment